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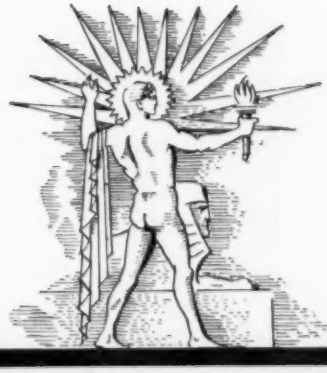
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



January 18, 1941

Turntable for Defense

See Page 41

A SCIENCE SERVICE PUBLICATION

Do You Know?

To transport *limestone* from quarries to a new cement factory in Sweden, a ropeway 28 miles long has been built.

Chemists foresee that *alfalfa* may be an important source for carotene and certain chemicals useful in food processing and in pharmaceuticals.

Britain hopes to save 50,000 tons of *tin plate* and sheet steel a year for munitions by prohibiting or limiting size of tins used in packaging goods.

By taking two photographs of a *lightning* flash at right angles to one another, scientists have been able more accurately to determine the length, and, hence, the velocity of the stroke.

A package of crystalline *vitamins*, the size of a two-pound box of candy, was presented to Dr. Tung Shen by Cornell University nutrition students, to enable him to study nutrition lacks of Chinese soldiers.

Providing information on man's customs, museums can help manufacturers to avoid decorative designs on goods for *foreign sale* which they think will please natives, but which often clash with religious ideas and superstitions.

When the southern ground *hornbill's* call is heard in South Africa, natives interpret the female as saying, "I'm going, I'm going home to my relations," and the male replying, "You can go, you can go, you can go home to your relations."

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ANTHROPOLOGY

How could a study of apes lead to an improvement in man? p. 45.

ASTRONOMY

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CHEMISTRY

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ENGINEERING

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PHYSIOLOGY

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PSYCHOLOGY

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What psychologists are aiding in the defense of morale? p. 38.

Why is it dangerous for democracies to imitate the propaganda methods of dictators? p. 39.

ZOOLOGY

Where do frogs have goiter? p. 41.

Camels were not important as pack animals in very early times, as they were not domesticated until about 1000 B.C.

A scientist found that from Feb. 15 to Nov. 1, one bee colony averaged carrying nearly 8,000 loads of *pollen* a day, each load representing visits to 80 or more blossoms.

New eyeglasses have dark red glass as the upper fourth of the lens, so that when a light is seen through the red segment, the *color-blind* motorist knows he must stop.

Psychologists say that no kind of *clothing* means more to a young child than gay-colored mittens, helmets, scarfs and bedroom slippers.

A report on venomous *snakes* of Central and South American areas where bases may be established has been prepared for the U. S. Navy Department.

A *synthetic ammonia* plant to be constructed at Wilson Dam, Ala., will be capable of producing 300 tons of ammonium nitrate, high explosive material, daily.

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ENGINEERING

American Armored Force Is a Fast-Growing Infant

In Six Months, It Increased in Size 350 Per Cent; Will Have Grown 1200 Per Cent Before Full Development

ALTHOUGH America's armored force is only an infant, as compared with the giant that crunched through the armies of Britain and France last spring, it is none the less a very fast-growing infant.

In the six months that have elapsed since it was officially born, on July 10 of last year, it has increased in size by 350% over its initial 7,411 officers and men and 1,800 vehicles, Maj. Gen. Charles L. Scott, U. S. A., its acting chief, reported to the Society of Automotive Engineers meeting in Detroit. By the time it reaches the full growth now planned for it there will be about 84,000 officers and men and 20,000 vehicles, or an expansion of approximately 1200%.

The armored force is a new and distinct weapon, a creature of the new World War, Gen. Scott pointed out. It is intended for deep-slashing forays far into the enemy's rear, disrupting his communications, destroying supplies and supports, and breaking morale. Working usually in close collaboration with the air force, it acts as a spearhead to open up a wound through which other arms —infantry, artillery and mechanized cavalry—can then pour themselves, to expand and exploit the initial advantage.

Characteristic of the armored force is its extreme concentration of machine-gun fire power, the speaker pointed out. For example, the streamlined infantry division brings into action about 250 machine guns of the usual .30 caliber type; the armored division carries 4,000 of these weapons—about 16 times as many.

Despite its terrific hitting power, the armored division was not held up as master of all weapons in the field by Gen. Scott. The armored division, he said, "is sensitive to terrain, cannot work in mountainous country and marshes, and is slowed down in terrain cut up by numerous stream lines. It is a powerful striking force but is weak in manpower for holding missions. It must be employed skillfully and forcefully at the appropriate time and place and be followed up promptly by other arms, in order to attain the greatest success in extensive operations."

There is some confusion, in the public mind, between a motorized unit and an armored unit, Gen. Scott stated. To clear this up, he defined motorized troops as those that ride into action in motor vehicles, but then dismount and operate on foot in more or less time-honored fashion. The armored unit rides into action in armored vehicles most of which are themselves weapons for its peculiar type of combat. It can fight mounted, dismounted, at a halt or in motion—usually by a combination of all these methods.

Science News Letter, January 18, 1941

Wider Rims for Tires

WHEN you buy a new car next year, or the year after that, the wheels may have wider rims than those on the '41 models. Results of a cooperative study by the tire and automobile industries have revealed a number of advantages —and some disadvantages—to larger rims, members of the Society of Automotive Engineers heard.

The proposal is to use existing tire sizes, but on rims 1 to 1½ inches wider than at present. This would make the ratio of rim width to tire width 75% to 82%; instead of 62% to 68% as they are now.

E. A. Roberts, of the Firestone Tire and Rubber Company, declared tests had revealed that with wide rim tires:

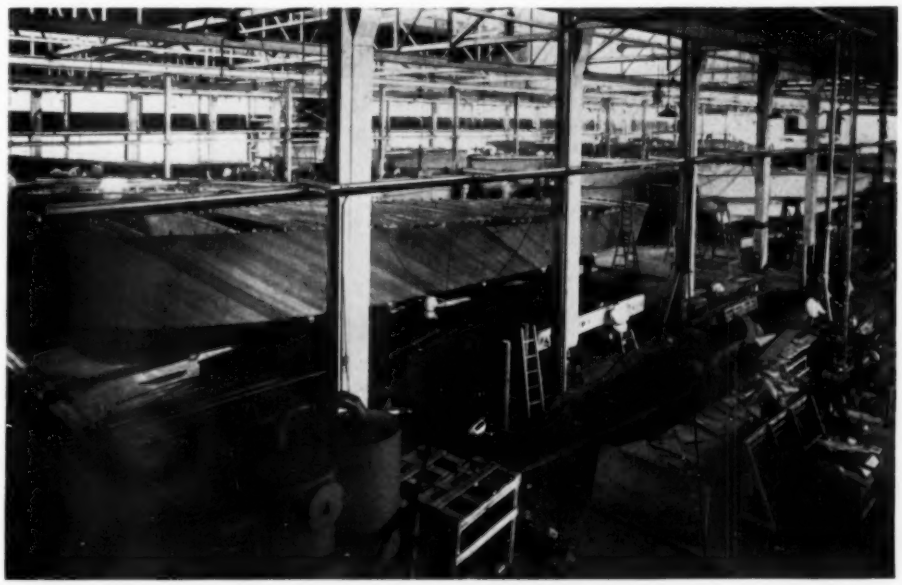
"1. There is an average improvement of 20% in non-skid tread mileage, the increase ranging from 5% for easy driving conditions to 80% for tests at maximum speed under hard driving conditions.

"2. Stability and cornering power increase with rim width—approximately in the same proportion.

"3. The effect of increased stability is very evident in improved cross-wind handling, especially at high speed.

"4. From 2 to 4 lbs. per sq. in. reduction in tire pressure was found necessary with wide-rim tires to produce equivalent ride, equal harshness, thump, and so on."

R. D. Evans, manager of the Tire Research Development Department of the Goodyear Tire and Rubber Company, pointed out that engineers had long recognized that wider rims increased a car's lateral stability and cornering



ON PRODUCTION LINE

Seventy-foot sub-chasers and motor torpedo boats are among the craft going through a production line designed and built by the Austin Co. in 75 days to speed defense. The photograph was made at the Elco Naval Works in Bayonne, N. J.

power. In these respects, he declared, widening the rim should have effects closely corresponding to increasing the inflation pressure.

"As far as the tire is concerned, the major, if not the only, discernible betterment of wide-base rims is that of treadwear," he said.

Speaking of the disadvantages of wide-base rims, he brought out that, by stiffening the tire and reducing its deflectability, widening the rim causes a harder, harsher, or joltier ride unless the inflation pressure is decreased sufficiently to give an equivalent ride. He pointed out that this pressure differential, believed to be necessary from considerations of ride, partially offsets the treadwear and stability advantages of wider rims.

Dr. Sidney M. Cadwell, of the U. S. Rubber Company, said that his company's tests had "shown that the wide-base tire and rim combination will perform somewhat better for: tire cord fatigue, tire rim bruise resistance, tire groove cracking resistance; would perform equally well for: tire heat dissipation up to 75 mph, tire power consumption, tire tread and fabric separation, tire sidewall breaks at the rim, tire squeal on turns, and tire noise or hum on straight roads; but would be inferior for: tire ride, tire harshness, pavement seam bump absorption, tire and car parking effort, rim curbing, and tire tread shoulder cracking.

"We approve the use of tires on wide-base rims," Dr. Cadwell concluded, "if the combined efforts of the car and tire engineers to re-balance the changed tire performance properties results in future cars of at least equal comfort and safety."

Science News Letter, January 18, 1941

Cooling Aided With Enamel

CONTRARY to an idea that coatings of paint and enamel act as insulators and keep heat in cylinders of airplane engines so treated, the coatings actually increase their rate of cooling.

This fact has been brought out in experiments made by Dr. Myron A. Coler, technical director of the Engineering Products Division of the Paragon Paint and Varnish Corporation.

Many factors entered into the cooling efficiency, he found. The color of the enamel proved important. One that was clear raised the cooling rate as much as 13%, though even a black enamel produced an improvement of 7%.

Another surprise was found in the effect of more than one coat.

"If the coating material functioned as a simple insulator, we would naturally expect the cooling efficiency to drop with increasing coat thicknesses," said Dr. Coler. "However, it must be remembered that the properties of such materials in the form of thin films may differ considerably from those of the same materials in massive forms."

While a layer of asbestos paper around a test cylinder reduced the cooling by 4%, one coat of enamel increased it 13%, two coats 20%, three coats 23% and four coats 24%.

Science News Letter, January 18, 1941

Leaner Mixtures Save 18%

LEANER air-fuel mixtures in modern automobile engines, as compared with those of 1927, have produced a saving of about 18% in fuel consumption, members of the Society of Automotive Engineers were told by a research quartet from the General Motors Corporation's Research Laboratories.

The group, comprising W. G. Lovell, J. M. Campbell, B. A. D'Alleva and P. K. Winter, commented that the air-fuel ratios used in automobiles are of special interest as representing the engineering compromise that must be made between the relatively lean mixtures which are desirable from the standpoint of economy of fuel, and the richer ones which are necessary because of inherent imperfections in commercial induction systems.

Comparisons of mixtures used by the cars tested in the three years were shown on graphs showing average and range of air-fuel ratios plotted against miles per hour at road load and full load, and percent of energy loss plotted against miles per hour at road and full load.

Science News Letter, January 18, 1941

Danger in Special Oils

DEFENSE may be endangered by the number of special oils that have been developed to meet the demands of a particular engine, class of design or service, R. J. S. Pigott, of the Gulf Research and Development Company, suggested.

In the past five years, he said, a situation has developed that "economically, is thoroughly unsound."

Charging that chemists have been called in to solve problems that really belong to the engineer, he stated that the chemist should be a last resort.

"A considerable number of oils have been developed," he declared, "which show improvement in some desirable characteristic, but by no means in all. Further, these oils generally work in a particular engine, class of design, or service, much better than the earlier oils; but in no case of which we are aware do they fit all cases. For example an oil with additives to suit one design of diesel engine may not be satisfactory in another design, nor serve for heavy-duty gasoline engines (truck and bus service). At the same time many diesels and many heavy-duty gasoline engines are getting along perfectly well on high-grade, straight mineral oils.

"It looks as if the program is getting to be prescription oils for too many cases. Look at the defense situation a moment. The Army and Navy will want not over four oils for *all* engine purposes, and they would be glad to use less. How can they possibly handle 15 or 20 prescription oils for particular designs?

Turning to fuels, Mr. Pigott pointed out that during the past 10 years the improvement in engine horsepower has been 20% due to increase in compression ratios following improvements in octane rating of gasoline, and 80% due to straight engineering design. If high horsepower is desired, he stated, supercharging is a good way to get it without going to synthetic chemicals for costly high octane gasoline. It costs millions, he said, to increase octane number a couple of points. He suggested that if supercharging is adopted "full intercooling should be used to cut down work for compression, lower terminal temperature to ward off detonation, and deliver a denser charge for high horsepower."

Science News Letter, January 18, 1941

CHEMISTRY

Strings for Racquets From Synthetic Fiber

STRINGS for racquets used in tennis, badminton and other games are now made of the same synthetic fiber that has become so popular for hosiery. Nearly a sixteenth of an inch in diameter, one of the "giant" strands, used for the new strings, is as much bigger than those used for stockings as a ship's hawser is bigger than a piece of package cord. Tests show the synthetic strings to be exceptionally durable and indifferent to the effect of water. (*E. I. du Pont de Nemours and Co., Arlington, N. J.*)

Science News Letter, January 18, 1941

ASTRONOMY

Illumination During Eclipse Equal to 24 Full Moons

Most Accurate Determinations Ever Made of Positions Of Sun and Moon Expected From New Photograph Series

DURING the total eclipse of the sun in Brazil on October 1, 1940, the illumination of the scene was equal to 24 full moons, Dr. E. O. Hulburt, of the United States Naval Research Laboratory, reported to the American Astronomical Society.

Despite cloudy weather which interfered with some of the planned observations, some data were obtained, the astronomers heard in a report from five members of the expedition which was sent jointly by the National Bureau of Standards and the National Geographic Society.

Dr. Hulburt's measures showed that most of the light at the eclipse came from the glow around the horizon, where light from the uneclipsed sun was scattered outside the moon's shadow.

The most accurate determinations ever made of the relative positions of the sun and moon will probably be obtained from photographs of the moon as it gradually covered the sun, Dr. Paul A. McNally, S.J., director of the Georgetown College Observatory, indicated.

In these, the partial, phases of the eclipse, he took 140 photographs on plates of especially fine grain. As many as six exposures were made on a single plate, the movement of the sun and the moon in the interval keeping them sufficiently separated to be identified.

The exposures were made at intervals of fifteen seconds as the moon first began to come in front of the sun, just as it completely covered it, as it started to go off, and as it left the sun completely.

Father McNally said that the laborious work of reducing his observations is still in progress, and that he cannot yet give a final report.

Dr. Irvine C. Gardner, of the Bureau of Standards, who led the expedition, explained the operation of the automatic equipment by which the various cameras were operated electrically. He showed a photograph of the bright inner part of the sun's corona, which was made through the clouds.

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LOOSE-CLOAKED

Skunk cabbage is the title thrust upon this attractive plant in the Pacific Northwest. True, its leaves are somewhat malodorous when bruised, like those of the true skunk cabbage of the East; moreover, the two plants are fairly close botanical relatives. Yet the Western species should hardly be called a skunk cabbage, for the flower structure itself is said to have a rather agreeable odor. The generic name, Lysichitum (or Lysichiton), is Greek for "loose cloak"—a reference, doubtless, to the open structure of the spathe. The photograph reproduced here is by Paul Miller of Seattle, and is being shown until Jan. 31, at the International Salon of Nature Photography in Boston.

GENERAL SCIENCE

Free Search for Truth Final Guaranty of Culture

Modern Commandment "You Shall Not Lie" If Followed Would Solve Most of Difficulties of the World Today

A MODERN commandment: "You shall not lie" if followed by mankind would solve most of the difficulties that beset the world today, in the opinion of the eminent historian of science, Dr. George Sarton of Harvard and the Carnegie Institution of Washington.

Although the Old Testament (Exodus 20:1-17) left it out of the Ten Commandments, although "few people except scientists realize the fundamental wickedness involved" to this day, Dr. Sarton urged upon the American Association for the Advancement of Science the teaching of the necessity for truth.

When Dr. Sarton protests against lying he does not mean merely the telling of positive lies. Lying consists as well in the suppression of truth and the suggestion of something else.

"Honest men know this by intuition and act accordingly in the ordinary business of life," he said. "Scientists refine the procedure and apply it to their own investigations. Yet all men, including scientists, need be taught that the same habits should be applied to social and political thinking.

"The relativity of truth as understood by the scientist is essentially different from scepticism or cynicism. The scientist realizes that he can approach it indefinitely by the method of successive approximations."

The free search for the truth, its publication and defense constitute the ultimate guaranties of culture, Dr. Sarton declared.

Science News Letter, January 18, 1941

● RADIO

Henry T. Paiste, director of research of the Philco Corporation, will describe the new phonograph which operates by a beam of light from a photoelectric cell in place of the old hard metal needle as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Jan. 23, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

PSYCHOLOGY

Psychologists Organize In National Emergency

Committee Formed Under National Research Council To Coordinate Research and Aid National Government

ORGANIZATION of psychologists to aid in problems of national defense is disclosed in announcement of an Emergency Committee on Psychology of the National Research Council.

The committee will attempt to keep in touch with and coordinate psychological work being done in the nation with a view to preventing duplication of effort and to being able to furnish any aid that may be requested by the Federal Agencies.

Scientists whose research or special knowledge would contribute to the psychological defense of the nation are urged in an announcement in the *Journal of Consulting Psychology* (Jan.-Feb.) to send their ideas direct to Dr. Karl M. Dallenbach, of Cornell University, chairman of the Emergency Committee. This, it is felt, will avoid the confusion and delay that might result were individuals to communicate directly with agencies or officials of the Government.

Included on the committee's membership are nine prominent psychologists, among them specially appointed representatives of all the leading national psychological associations.

Contact with the Government is provided for in the selection of two members of the Committee, Prof. Robert M. Yerkes and Prof. Walter R. Miles, both of Yale University, to get in touch informally with individuals in the Federal Government to express the willingness of psychologists of the nation to render service in furthering national defense.

Action was taken by the Committee at its first meeting on several urgent problems, and research programs of defense importance were discussed.

The effect of war experiences on the lives of individuals will be given special study by Prof. R. A. Brotemarkle, of the University of Pennsylvania, and a group of psychologists he will pick to assist him.

It was recommended that problems of perception be studied by a sub-committee under the chairmanship of Prof. S. W. Fernberger, of the University of Pennsylvania.

Published material having to do with military psychology will be canvassed and listed under the direction of Prof. Carroll C. Pratt, of Rutgers University.

Necessity for investigating problems of nervous ills in connection with the present emergency was discussed. Another Committee of the Research Council on Problems of Neurotic Behavior will be requested to consider such problems which would include the working out of methods for detecting and caring for neurotic persons.

The Committee considered a request for the names of psychologists acquainted with South America, having traveled, taught, or done research there, and of those able to speak Spanish and Portuguese. This request was referred to Dr. Leonard Carmichael, a member of the Committee who is also director of the Government's National Roster of Scientific and Specialized Personnel.

Members of the Committee are: Dr. Carl E. Guthe, University of Michigan, chairman of the Research Council's Division of Anthropology and Psychology (ex officio); Dr. Karl M. Dallenbach, Cornell University, chairman of the Committee, representative of the psychology section of the American Association for the Advancement of Science; Prof. Gordon Allport, Harvard University, representing the Society for the Psychological Study of Social Issues; Prof. R. A. Brotemarkle, University of Pennsylvania, representing the American Association for Applied Psychology, President Leonard Carmichael, Tufts College; Prof. Walter S. Hunter, Brown University; Dr. Walter R. Miles, Yale University, representing the American Psychological Association; Prof. Carroll C. Pratt, Rutgers University, representing the Society of Experimental Psychologists; Dr. Dael L. Wolfle, University of Chicago, representing the Psychometric Society; and Prof. Robert M. Yerkes, Yale University.

Science News Letter, January 18, 1941

PSYCHOLOGY

Plan Psychological Defense For America's Morale

TO KEEP up the spirits of the American people and save them from possible discouragement, panic, or demoralization in any future war of nerves, psychologists have mobilized their talents and are planning a psychological defense.

A recent gathering in Washington to study the "Psychological Factors in National Morale" brought together 20 leading psychologists and representatives from various agencies of the Government, it is revealed in the *Psychological Bulletin,* (December).

Research in this field is also attracting the attention of individual psychologists, another item in the same journal indicates.

Psychologists want to know what a year of peace-time compulsory military training or service will do to the attitudes of American youth. Will they be more or less militaristic? More or less patriotic? More or less inclined toward Fascism, Socialism, or Communism?

A before-and-after survey of opinion among selectees will provide a scientifically-based answer to such questions to replace present guesses and speculations. Psychologists are urged to pool their efforts along such lines and coordinate their research through a special committee on "Morale in a Democracy" of the Society for the Psychological Study of Social Issues. Dr. Gardner Murphy of the College of the City of New York is chairman.

Among the scientific leaders taking part in the Morale Conference were Dr. Gordon W. Allport, social psychologist of Harvard University, who acted as chairman; Dr. J. R. Angell, educational counselor for the National Broadcasting Company; Prof. Ruth Benedict, anthropologist of Columbia University; Dr. R. A. Brotemarkle, of the University of Pennsylvania, who made a special study of morale during World War days; Dr. Harvey Cantril, student of radio and public opinion, Princeton; Dr. Leonard Carmichael, president of Tufts College

and director of the National Roster of Scientific and Specialized Personnel; Dr. Elmer Culler, of the University of Rochester; Dr. Leonard Dobb, Yale's Institute of Human Relations; Dr. H. B. English, Ohio State University; Dr. P. R. Farnsworth, University of Wisconsin; Dr. George H. Gallup, director of the American Institute of Public Opinion; Dr. Walter S. Hunter, Brown University; Dr. J. G. Jenkins, University of Maryland; Dr. Rensis Likert, Bureau of Agricultural Economics; Dr. L. G. Lowrey, New York psychiatrist; Dr. W. R. Miles, Yale University; Dr. H. A. Murray, Harvard; Dr. G. A. Murphy, College of the City of New York; Dr. R. S. Woodworth, Columbia University; and Dr. R. M. Yerkes, Yale University.

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PSYCHOLOGY

Dangerous for Democracies to Imitate Dictator Propaganda

Axis Propaganda Experts Base Their Methods on Assumptions Regarding "Mass Mind" Without Foundation

DANGER is attached to imitating in democratic countries the propaganda methods of the dictator states, warns Prof. F. C. Bartlett, of the University of Cambridge, well-known British psychologist. His warning is contained in a new book, *Political Propaganda* (Cambridge University Press. *Reviewed, SNL this issue*).

Although specialists in political propaganda claim that their methods are based on special knowledge of the "psychology of the masses," actually, Prof. Bartlett declares, this knowledge turns out to consist in high-sounding generalizations for which there is not one scrap of experimental scientific evidence.

Propagandists of the dictator states express an unshakable belief that people in the mass exhibit "a childish, primitive, inferior, mean and altogether despicable intelligence."

Such an assumption, Prof. Bartlett has shown, is not necessary and would be wholly destructive of the very foundation of democracy.

The implication of the propagandist is that he arrogates to himself a superiority denied to others. Between him and his public, there is a great gulf and the widest part is in intelligence. Sometimes this claim is not just implied but is loudly asserted.

To this, Prof. Bartlett finds an answer in his research.

"It is now clear enough," he says, "that the distribution of intelligence is not markedly variable in any large group taken at random anywhere throughout the civilized world, and it is wildly improbable that any small group, not selected primarily and specifically for intelligence, should be, in fact, supreme in brain power.

"In particular, there is so far no political directing group anywhere which has been selected chiefly on a basis of intelligence, and there probably never can be, since in such a group other qualities, such as rapidity of decision, leadership, public spirit and a liking for responsibility, are at least equally important."

In a democracy, Prof. Bartlett urges, propaganda must be based on scientific knowledge of the people and a desire to stimulate in them responses that will be to their benefit.

"It is almost unbelievably strange that society has, up to now, left the study of human factors almost wholly to speculation and to arm-chair analysis.

"Methods are, however, beginning to take shape which bid fair to set the investigation of such factors, and of the ways in which they operate upon a firmer and more scientific foundation.

"It may be a matter of life and death for the democracies of the world that these methods, whether in war or in peace, should be given the greatest possible encouragement and development."

"Mankind has resources and does not know how to use them, so that even large masses of people may be induced to believe the most extraordinary things about themselves just because they are said with tremendous emphasis and assurance by any self-styled authority.

"Muddle and disorder inevitably follow and will continue, until science is given as great an opportunity to investigate and understand the human mind as it has been and is being given to discover and direct the processes of the external world."

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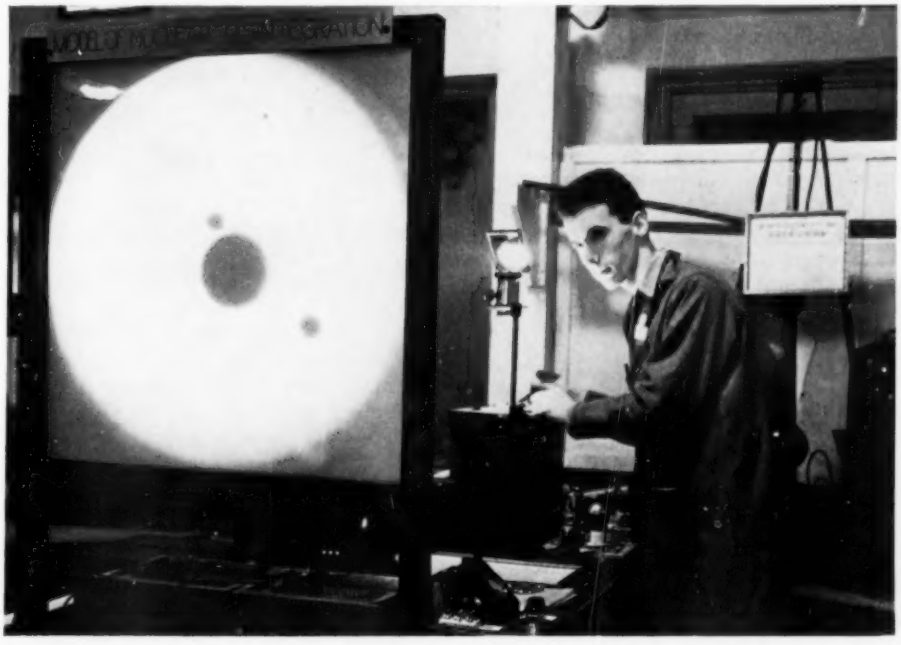
According to tradition, Alexander the Great considered digging a canal at *Suez*, but feared the mouth would silt up.



NUCLEAR DISINTEGRATION

To illustrate atomic nuclear disintegration the Haverford College Department of Physics used this projection apparatus in the exhibit at the Philadelphia meeting of the American Association for the Advancement of Science. William Harris, a student of the college, is shown working the machine.

ENTOMOLOGY

Panama Mosquito Species Appears in Texas

A MOSQUITO species hitherto known only from Panama has appeared on the coast near Brownsville, Texas. Dr. Frank W. Fisk of the University of California, who has made a study of the insect's peculiar habits, conjectures that it may have traveled to its new home by plane.

Fortunately for human beings, the invader is exceedingly retiring, does not bite man, and is not known to carry any disease. Its larvae or "wigglers" live in the holes made in the beach by the innumerable fiddler crabs that swarm along the Gulf shores. The adults prefer to feed on cold-blooded animals, and mate in confined spaces.

The insect is known to entomologists by the technical name *Deinocerites spanius*.

Science News Letter, January 18, 1941

CHEMISTRY

College Laboratory Makes Rare Acids

THE European war has caused a spurt in the production of rare amino acids on the Los Angeles campus of the University of California, according to Dr. Max Dunn, associate professor of chemistry.

Dr. Dunn operates a non-profit company, Amino Acids Manufacture, on the Los Angeles campus with the assistance of M. J. Stoddard. The company, formed by Dr. Dunn in 1935 shortly after he first began his study and found that only a few of the twenty-three acids were produced, is one of the three organizations of its kind in the United States.

Since then Dr. Dunn has been able to produce nearly all the acids, and he sells these to laboratories and medical clinics all over the world.

The chemist knows amino acids as constituents of proteins but in appearance they look like bath salts crystals. They are manufactured from a variety of substances such as glue, human hair, dried cottage cheese, dried blood, etc. Some of them are so difficult to produce that they sell for $1000 a pound—worth twice their weight in gold.

The acids, which seldom occur free in nature, make up the protein of man's hair, skin and fingernails.

"Amino acids are no longer coming through from Germany and Switzerland," said Dr. Dunn, "and we are getting about twice as many orders as before the war."

Amino acids are used for a number of purposes. One kind is used as a flavoring for soups and gravies and has a surprising meatlike taste. Other types of amino acids are used in medical research on baldness, cancer, and muscular diseases. Amino acids are already used in treatment of such disorders as gastric ulcers and muscular ailments.

Science News Letter, January 18, 1941

ENGINEERING

Letting Radiators Freeze Unpatriotic in Britain

PUTTING anti-freeze into the radiator is a patriotic act in Britain now. Contrariwise, letting one's car freeze up is denounced as aid and comfort to the enemy, by the English motorists' journal, *Modern Transport* (November).

In times of peace, the journal's editor remarks, it is nobody's business but the motorist's if he lets his car freeze up and perhaps incurs serious damage to the engine. Now, however, "such carelessness is definitely unpatriotic, for the work entailed in getting the vehicle back into service makes an unnecessary call on the national effort. It means that labor and material must be diverted from some other task in order to effect the repair. It is for this reason that the Minister of Transport has issued a reminder that during this winter it will be more than ever necessary to take precautions against damage by frost."

Science News Letter, January 18, 1941

ASTRONOMY

List of Nearby Stars is Increased with Two More

DISCOVERY at the Mt. Wilson Observatory of the Carnegie Institution of Washington of two more nearby stars has raised to 37 the number within 5 parsecs (16.3 light years) of the sun.

According to Dr. Walter S. Adams, director of the observatory, they have been found by Dr. Adriaan van Maanen. They are faint stars, known by their catalog numbers as Ross 128 and Luyten 789-6. The distance of the former is 11.3 light years and of the latter 10.3 light years.

Among the 37 stars within 5 parsecs, Dr. van Maanen has found 13 companion stars associated with them.

Science News Letter, January 18, 1941

IN SCIENCE

PHYSICS

Better Stop Your Car When Wall Looms

DON'T try to turn out of the way to avoid running into a stone wall that suddenly looms up before you when you are at the wheel of a speeding auto. Try to stop.

This is the advice based on the laws of physics given by Dr. Seville Chapman, University of Kansas physicist.

Suppose that your car is traveling at high speed along a side road and comes to the main road along the far side of which is a stone wall. That is the very practical problem Dr. Chapman chose to solve by the methods of physics.

If just so much force is available and can be used in turning and stopping, Dr. Chapman finds that the best thing to do is to keep on going in a straight line and use available force in stopping.

It is unquestionably better to stop rather than try to dodge an object on the road even when it is not nearly as large as a wall blocking the whole road.

Physics shows it is wisest to try to stop even though it may be but human to try to dodge, Dr. Chapman's conclusions indicated.

Science News Letter, January 18, 1941

ENGINEERING

Trailer Fire Unit Saves Times in Emergency

A NEW portable fire-fighting unit, designed to be hooked up as a trailer for emergency use, promises to be a powerful weapon in preventing losses of time and material in plants working on defense projects. It has six 50-pound carbon dioxide cylinders, which deliver their gas through a 100-foot half-inch hose. Two portable 15-pound carbon dioxide cylinders are mounted on the front for smaller fires. In addition, there are two 2½ gallon water extinguishers, in which the liquid can be propelled to 40 feet or more by the pressure from a small carbon dioxide cylinder, operating on the same principle as the popular refillable soda water siphons. (*Walter Kidde and Co., Bloomfield, N. J.*)

Science News Letter, January 18, 1941

E FIELDS

ZOOLOGY

Goiter Found to Afflict Swiss Game Animals

GOITER, long known as a prevalent human affliction in some parts of the Alps, now proves to be an ailment of game animals as well. Deer, chamoix and hares have been found with pronounced goitrous swellings, which upon dissection proved to be due to enlarged thyroid glands. The same condition was also found in frogs. It seems to be genuine goiter, due to iodine lack in the soil, and hence in the animals' food.

Another deficiency disease found in other parts of the mountains indicates serious calcium and magnesium deficiency. Skulls of chamoix and other game animals were abnormally thin-boned. The well-known Swiss student of wildlife, Dr. Arnold Pictet, who has reported these abnormal conditions, states that chamoix tend to congregate near the bases of the mountains, where lime is more abundant in the soil water, and that in these situations the animals are healthy and normal.

Science News Letter, January 18, 1941

ARCHAEOLOGY

Hebrew Inscriptions Found On da Vinci Sculptures

HEBREW inscriptions, unnoticed for more than 400 years, have been discovered on a group of Biblical sculptured figures created by Leonardo da Vinci and shown in copy form at an exhibit of da Vinci art and inventions in New York.

Dr. Paul Romanoff, curator of the Museum of the Jewish Theological Seminary of America, who has translated the Hebrew writings, concludes that the statues were made or cast by a Jew, a baptised Jew, or one of the Marranos, Jews who kept their religion secret in Renaissance times. According to history, Leonardo created the statues, modeling them, and then they were cast by Giofrancesco Rustici. The inscriptions, which have remained unnoticed because of their lofty place over the door of the Baptistry in Florence, must surely have been noticed by da Vinci and Rustici, Dr. Romanoff states.

Representing John the Baptist flanked by a Pharisee and a Publican, the sculptured group has never been copied until the present cast was made for exhibit, revealing the unknown inscriptions. The writings on folds of John's garment and the pedestal include New Testament quotations and a personal record of one Giovanni, son of Moreas, who may prove to be the artist or caster. Finding the inscriptions makes it necessary now to examine other sculptures by Rustici and other Renaissance sculptors for more writings that may clear up the puzzle. While Europe's masterpieces are in hiding, America has many casts for study.

Science News Letter, January 18, 1941

ENGINEERING

Cuts Fourteen Miles Of Steel Per Hour

See Front Cover

CAPABLE of cutting 14 miles of steel shavings in an hour from a 500-ton piece of steel, a 350-ton machine has just started work in the East Pittsburgh plant of the Westinghouse Electric and Manufacturing Co. It will speed up production of large waterwheel generators and other power equipment needed in the national defense program.

One of the largest boring mills in the world, the machine supports its work pieces on an 88-ton turntable while two special steel, chisel-like tools do the cutting—like a phonograph needle moving across a record. Eleven freight cars were required to deliver its parts from the works of the machine tool manufacturer.

A pit large enough to hold four six-room houses had to be dug in the generator manufacturing aisle at East Pittsburgh to make room for the machine's 24-ton foundation of steel and concrete.

But despite its mass, this new steel Titan makes its cuts with an accuracy of four thousandths of an inch, performing on giant-sized machine parts the work of a fine watchmaker's lathe.

Science News Letter, January 18, 1941

ENGINEERING

Power Hand Tool For Home Craftsmen

A POWER hand tool will be useful to home craftsmen in hammering out copper for ashtrays, etc., engraving, tooling leather, etc. It has a reciprocating plunger that gives 800 blows per minute. (*Chicago Wheel & Mfg. Co.*)

Science News Letter, January 18, 1941

LANGUAGE

New Synthetic Language For Hemisphere Solidarity

IN THE interests of Hemisphere solidarity, the people of all the Americas will, within the next few years, be speaking the same language if a proposal made by scientists is put into effect.

The language will not be English. And it will not be Spanish, Portuguese, or French. A new language to be created for the purpose by linguists of all the Americas and based on the language customs already familiar to the people is the key to improved scientific and cultural relations proposed by Dr. Bronson Price, of Ohio State University.

It is easier to learn such a language than it is to master one based on rules, Dr. Price found in learning experiments he conducted with Drs. W. M. Taylor and W. J. Kostir. They chose two pairs of identical twins for the experiment.

In each case the twin whose task was to master the naturalistic language made up on the basis of his language habits learned faster and more accurately than did his brother who struggled with a language based on logical rules.

Science News Letter, January 18, 1941

ASTRONOMY

Stars Exert Little Pull On One Another's Paths

A PERIOD of a hundred million million years would be required for one star, by gravitational attraction, to pull another out of its path, when they are as far apart as they are in this part of the universe.

So announced Dr. Ralph E. Williamson, of the Yerkes Observatory of the University of Chicago at the meeting of the American Astronomical Society in Philadelphia. Even to change the path by half a degree, which is the diameter that the moon seems to have in the sky, would take about three billion years.

The importance of this result is in the study of the motions of the stars in the Milky Way system of stars, of which we are part, and of other such systems, or galaxies. It shows, said Mr. Williamson, that the effects of the encounter of one star with another can be ignored in such systems. On the other hand, he explained, in the globular star clusters, it can be important. These are ball-shaped groups of thousands of stars, which are closer together than around the sun. Such encounters, more frequent, might produce greater effects.

Science News Letter, January 18, 1941

PHYSIOLOGY

Seven-Mile Jumps

Dogfights 35,000 to 40,000 Feet Above the Earth Necessitated New Oxygen Apparatus for Bailing Out

By JANE STAFFORD

DEFENSE against bombers is speeding ahead in medical research laboratories these days as well as in airplane and anti-aircraft factories. The doctors are giving us a new means of combatting high-flying night bombers.

Fighting planes and commercial airliners can now climb to the sub-stratosphere. It is this high flying that gives the odds to the attackers. It causes the failure of the defending air force.

At seven or eight miles up in the night air, planes can elude searching beacon lights, anti-aircraft guns and fighter planes, to drop bombs on sleeping cities and vital factories or rail centers, then speed safely away.

Occasionally a plane dropping destruction from 35,000 to 40,000 feet above the earth's surface does not get away safely. During World War days the pilot, when his plane was hit and disabled during a dogfight, could bail out. Supported by his parachute, he drifted safely to the ground. That was when planes flew only a mile or so above the surface of the earth.

Today super-charged engines drive modern planes to seven and eight times such altitudes. The flyer whose plane is disabled at these sub-stratosphere heights cannot be saved by his parachute alone. He would die on his way to earth even if he lived long enough to make the jump and pull the rip-cord of his 'chute. Latest aero-medical research shows that he would not have a chance even to make the jump, unless he made certain vital preparations.

The reason why no parachute alone could save a flyer bailing out at 35,000 feet altitude is that the air at this distance from the earth's surface does not contain enough oxygen to support life. Pilots can only fly at these heights because their planes are equipped with oxygen tanks. The pilots of bombing planes and others ascending to high altitudes wear masks or mouthpieces connected with a tank of oxygen which constantly supplies them with this vital gas.

When they are forced to bail out, they must leave this life-protecting equipment behind. Unless they carry their personal supply of oxygen with them, they might just as well not try to jump. It takes nearly 15 minutes to get down from 35,000 feet or 40,000 feet to a level where the oxygen pressure will be high enough for the parachute jumper to live. Emphasizing this danger to the pilot, Dr. Walter M. Boothby, of the Mayo Clinic, states:

"If he gets into a dogfight up in those high altitudes, and his plane bursts into flames, he is a gone duck unless, after bailing out, he can be kept alive for at least 10 minutes with oxygen until he floats down to the 18,000-foot level."

Dr. Boothby is one of a group of aero-medical researchers who have been and are still working to guard flyers against the danger of oxygen lack at high altitudes. For their researches, Dr. Boothby, Dr. Harry G. Armstrong, captain, U. S. Army Medical Corps, and Dr. William Randolph Lovelace, 2d, of the Mayo Clinic, were awarded the Collier Trophy, one of the most important national awards in aviation. In awarding the trophy, the committee gave special credit to Dr. Arthur H. Bulbulian, also of the Mayo Clinic, for his work in developing a special mask for delivering oxygen to flyers.

In the latest investigations, Captain Otis O. Benson, Jr., U. S. Army Medical Corps, Dr. Howard Burchell, of the Mayo Clinic, and Milo G. Burcham, well-known test pilot of the Lockheed Aircraft Corporation, have taken part.

These scientists have come to the rescue of the pilot faced with the danger of having to jump for his life from an altitude of 35,000 or 40,000 feet—the world's longest and most hazardous jump. Before Captain Benson and Dr. Lovelace and Mr. Burcham themselves

OUTFIT

What the well-dressed parachute jumper will wear. The emergency oxygen tank goes in a pocket on his left. The tube to the right connects with the main supply but can quickly be disconnected for a jump, when the emergency supply is used.

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38 QUARTS

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made such jumps in tests at the Mayo Clinic, no one, so far as could be learned, not even the most daring Caterpillar Club member, had dared to jump from higher than 20,000 feet above the earth's surface. The test jumps were not made in the air in actual parachute jumps but in the low pressure chamber at the Mayo Clinic. The potential danger of death from lack of oxygen, however, was just as great as it would have been in an actual parachute jump, in that the air in the chamber was converted into the same rarefied atmosphere encountered at sub-stratosphere levels. Mr. Burcham, in fact, passed out and was only rescued in the nick of time by his observer who promptly supplied him with 100% oxygen.

The reason this test pilot, a man in excellent physical condition who has proved he is less susceptible to oxygen lack than the average normal person, passed out in the test jump was because he delayed too long in transferring from the plane's oxygen supply to his own emergency supply.

The emergency supply consists of a pocket oxygen tank, about the size of a flashlight. It was designed especially for pilots forced to bail out at these deadly, if heavenly, altitudes. This baby oxygen tank carries about 38 quarts of oxygen, delivering at the rate of about two quarts per minute. The amount of oxygen in the baby tank was based on the assumption that it would take a pilot from 10 to 15 minutes to descend from altitudes of 35,000 or 40,000 feet to 18,000 feet where he would be safe from the danger of oxygen lack. When first made, the scientists could not be sure whether or not the tank actually contained enough oxygen for its life-saving purpose.

Captain Benson and Dr. Lovelace volunteered to test this crucial point by making the jumps with only the untried baby oxygen tank as their source of oxygen during what might prove a perilous descent. To guard against misfortune, they made the jumps alternately, each standing ready to supply the jumper with oxygen if the baby tank supply failed.

The jumps were made successfully. The total time occupied in going from 35,000 feet to 20,000 feet was seven minutes. In actual flight, the pilot would probably be even lower in seven minutes, because he would delay pulling his rip cord for 15 seconds, during which time he would gain quite a distance before he was slowed down by his parachute opening.

The calculated oxygen supply in the baby tanks proved ample, enough remaining in the cylinder to bring the men down still further than 20,000 feet. Only on the first descent when the subject was a little nervous and not breathing properly was there the slightest evidence of cyanosis.

Pilots can safely bail out in the substratosphere when carrying this personal oxygen supply, the experiments showed. Merely carrying the baby tank in the pocket of the flying suit, however, is dangerously not enough. It must be used, and used promptly. Mr. Burcham discovered this when he made his test jump.

The very first, vital thing the pilot must do when forced to bail out at altitudes of 35,000 or 40,000 feet is to change from the plane's oxygen supply apparatus to his own personal oxygen supply tank. Delaying to start the emergency oxygen apparatus, going without any oxygen for as short a time as 30 seconds, was nearly fatal to Mr. Burcham. In his test jump he used the wrong method.

Instead of adjusting his emergency oxygen mouthpiece immediately after removing the regular oxygen mask, he first went through the motions of trying to open a jammed cockpit cover, releasing the safety belt, and standing up as though to jump out. When at this point he started to adjust the emergency oxygen mouthpiece, he was fast losing consciousness. The emergency mouthpiece fell out of his mouth, he became completely unconscious, stopped breathing, turned blue and was out for 15 seconds until his companion could get a mask over his face and the 100% oxygen supply started. In actual flight conditions, there would of course be no such chance for rescue and the pilot

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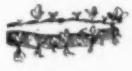

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would probably not live to pull the cord on his parachute.

Before making the ascents to the artificial sub-stratosphere for the jumps, Mr. Burcham, Captain Benson and Dr. Lovelace had taken newly discovered precautions against the danger of aeroembolism. This condition has been popularly called "air-bends," because it is so like the bends which often afflict deep-sea divers, caisson workers and others descending to low atmospheric pressures.

Boring, gnawing pains about the joints, itching of the skin and eyelids, unconsciousness, convulsions and paralysis, including paralysis of the breathing muscles, are among the symptoms of aeroembolism. Small blood vessels in the lungs may be plugged by emboli, thus cutting off the blood supply. It would be easy to see what the result of such an attack would be to a pilot of a fast, heavy plane.

The condition, in which nitrogen bubbles form in the blood and body tissues, was discovered by Captain Armstrong. An altitude of 30,000 feet seems to be the critical point for development of air-bends. Recompression, that is descent to a lower altitude where the atmospheric pressure is higher, is the treatment for the condition.

Air-bends can, however, be prevented, the Mayo Clinic investigators discovered. The method is almost like super-charging the pilot with oxygen before he takes off, the way his plane's engine is super-charged to carry him to high altitudes. Actually the pilot gets tanked up on oxygen rather than super-charged.

Seasoned pilots of Northwest Airlines, Inc., took part in experimental test ascents climbing to 40,000 feet at the rate of 4,000 feet per minute.

The pilots prepared for the flight by breathing pure oxygen for 30 minutes while walking two miles on a treadmill. With this preparation the pilots were able to make the ascents safely.

Science News Letter, January 18, 1941

ALTERNATE

Another form of mouthpiece for the oxygen supply. The jumper grips this between his teeth. It is less likely to be damaged by the rush of air as he jumps than the other type.

RADIO

New Radio Direction Finder Useful For Small Boats

A RADIO direction finder that will tell the direction of signals from stations as far away as 200 miles yet weighs only 17 pounds has recently been introduced. It is expected to be useful for the smallest privately owned boats. (*Ansley Radio Corp., 4377 Bronx Blvd., N. Y. C.*)

Science News Letter, January 18, 1941

ASTRONOMY

"Wonderful" Star Mira Is Bubble Within Bubble

THE STAR Mira, the "wonderful," which sometimes is among the brightest in the sky and at other times so faint that a telescope is needed to see it, is really a bubble within a bubble, alternately expanding and contracting. Such a suggestion was made to the meeting of the American Astronomical Society by R. M. Scott, of the Harvard College Observatory.

The double bubble construction is necessary, he said, to explain the peculiar behavior of the star. It has been generally accepted that stars of the type known as Cepheid are pulsating, and efforts have been made to explain stars like Mira on the same basis. But difficulties arose when it was found that measures of the size of the star from the shifting of the dark lines that appeared in its spectrum differed from those measured by its heat radiation.

Mr. Scott proposed that the surface at which the temperature is measured is not the same as that where the absorption of the light, producing the dark lines, occurs, as it is in most stars. However, the apparent surface of the star seems to be the same as that where the bright lines of the spectrum originate.

Using the bright lines, he found he was able to obtain measurements which agreed closely with the light variation.

"It was found that these stars were considerably nearer the sun than previously was suggested and thus intrinsically fainter," he said. "The minimum diameter of the surface of measured temperature of Mira was placed at —2.1 a. u and the maximum at 3.0. It was

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also established that the density decreased very slowly with distance from the center throughout the outer layer." He also proposed that a large proportion of molecules is present in the atmosphere of these stars.

Science News Letter, January 18, 1941

NUTRITION

Nutrition a "Must" Item in Hemisphere Solidarity

Tropical American Diets Lack Calcium and Vitamin A But Advice To Drink Milk Would Be Impractical

FOOD and nutrition should be a "must" item for consideration in a program for Western Hemisphere solidarity, Dr. George R. Cowgill, associate professor of physiological chemistry at Yale University, declared in a De Lamar lecture at the Johns Hopkins School of Hygiene and Public Health.

Many of the dietaries in common use in tropical America are "far from satisfactory in several respects," Dr. Cowgill found from his own observations during two summers in Panama and other tropical American countries. Dr. Cowgill made his studies of the possibilities of nutritional research among the natives in Panama at the request of Dr. Herbert C. Clark, director of the Gorgas Memorial Laboratory.

Tropical American diets lack calcium and vitamin A particularly, Dr. Cowgill found. Advice to consume more milk to make up the calcium deficiency would be impractical, he pointed out, because a dairy industry is practically non-existent except in particular sections of tropical America.

The Mexican Indians use lime in removing the bran layer from the corn kernel and this results in addition of calcium to the final edible product, probably accounting partly for the splendid condition of the teeth seen in most of these people. Other tropical Americans might be helped to get more calcium in their diets by development of other similar uses for lime, Dr. Cowgill suggested.

Better returns on American capital invested in development of natural resources in tropical America are to be had from improvement, through food and other means, of the health of the local tropical laborers, Dr. Cowgill pointed out.

"If the purely humanitarian consideration of improvement in the health of all groups of people, regardless of locality, race, and other considerations, does not constitute sufficient reason for becoming interested in nutritional problems of tropical America," he said, "then I offer the one just stated which is related definitely to an enlightened self-interest and a matter of dollars and cents."

Science News Letter, January 18, 1941

ANTHROPOLOGY

Study of Apes Points Way Towards Better Human Beings

HERE is a prescription for our ailing planet, wracked with wars and woes:

"What this world needs is better human beings: man, woman, and child, in every stratum of its population and in every country."

The doctor is Prof. Earnest A. Hooton, Harvard University specialist in anthropology, science of man.

"The world chaos of today is due to the debased intelligence of the mass of 'civilized' men and to nothing else."

So Prof. Hooton diagnoses the trouble in a new book of lecture essays provocatively titled, "Why Men Behave Like Apes, and Vice Versa" (*Reviewed SNL, this issue*).

Calling degenerate behavior the rule, not the exception, among human beings, this anthropologist says that man's biological fiber has rotted by indolence and inertia. If human beings did not stand on two feet, they would lose their erect posture, and the same principle of disuse can cause mental and physical faculties to deteriorate, Prof. Hooton sharply warns.

Machines and charity get special blame from this critic of man's defects, who says that they cause this atrophy by making mankind idle. As he puts it, they "have made man into something less respectable than an ape through sheer atrophy of function."

Warfare is seen as another force dragging man down, and medical science is taken to task for keeping alive millions of diseased and disabled without sufficient knowledge to cure them.

Inferior human stuff lacking in moral stamina and intelligence—so runs this anthropologist's terrible description of the generation in Europe born after the great and weakening World War, and now struggling in coils of another war.

Pathologically suggestible is another term applied to post-war generations. This trait of willingness to believe without thinking is so sweeping Germany that Prof. Hooton says the whole

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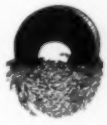

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nation seems in the grip of the mental disease paranoia.

In this serious state of man's affairs, the average person would not expect help from apes and monkeys. But in the zoo and animal laboratory anthropologists seek important basic information for understanding human behavior. Studies of these primates shed light on the extent to which body characters predetermine distinctive behavior.

Chimpanzees, whose personalities and habits have been studied most closely, have about the same keenness of sight, hearing, and smell as man, very similar emotional expressions, not nearly so much imaginative power as man, apparently. Chimpanzees show altruism by sharing food, they do social service work by cleaning and grooming one another. Chimpanzees vary widely in personality, from the lazy to the industrious, bright to stupid, bold to timid.

The great apes, says Prof. Hooton, all stand on the threshold of human behavior. He adds, perhaps they are wise in forbearing to enter.

If humans do not turn their boasted intelligence to biologically reclaiming man, civilization will perish, warns the anthropologist. Birth control and sterilization he rates helpful in man's biological salvation, but negative measures are not sufficient.

Vastly more important than eliminating the inferior, urges Prof. Hooton, is the need for medical, biological, and social scientists to join forces for intensive research. After perhaps a million years of life on earth, man still has not determinedly tried to find out what the human capacities in the individual are, and by what means individuals can be improved by better breeding.

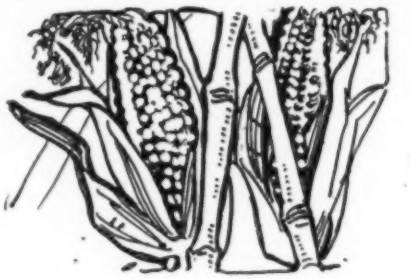
Along with billions for defense, Prof. Hooton would have nations spend a few millions to find out how to improve the quality of the human organism.

Science News Letter, January 18, 1941

AGRICULTURE—ECONOMICS

NATURE RAMBLINGS

by Frank Thone



In a Changing World

ECONOMIC and social problems faced by American farmers and ranchers are the main theme of the new U. S. Department of Agriculture yearbook, *Farmers in a Changing World*. (*Reviewed, SNL, this issue*) Hon. Henry A. Wallace, who was Secretary of Agriculture when the preparation of the book was started, and Hon. Claude R. Wickard, who had succeeded him in office by the time it was completed, both stress the fact that changes are still going on—all the more rapidly because of the new crisis in our national life that has arisen in the past few months—and that nothing in its chapters is to be taken as final.

Because of the strengthened trend toward national unification that has marked the coming of the crisis, unusual interest will attach to two chapters in the book's second section, "The Farmer's Stake in Greater Industrial Production," by Louis H. Bean, and "The City Man's Stake in the Land," by Arthur P. Chew. Mr. Bean calls attention to the strain placed upon the interdependence of industry and agriculture by their contrary behavior during depressions: in agriculture, production remains essentially stable while prices decline heavily, whereas in industry prices remain essentially stable but production is drastically reduced. Yet cutting prices of industrial products will not tempt farmers to buy at such times; volume of agricultural purchasing, says Mr. Bean, is more likely to follow the farmers' cash income than the prices of commodities offered in his market. He calls attention to a "middle way" that has been proposed, involving simultaneous encouragement of private capital outlays and increasing public investment, together with an expansion of community consumption to supplement private consumption.

Mr. Chew looks closely at the urban problems created indirectly by distress on the land. Depressed agricultural prices force farmers to mine their soil in order to meet debt and tax payments; this in turn exposes the soil to erosion and reduces farm productivity and value, and thus a vicious downward spiral is started, that ends with the crowding of dispossessed farmers into cities to compete for jobs in overcrowded industries

Absentee ownership of the land, as Mr. Chew sees it, is harmful to urban interests rather than beneficial to them, as might appear at first glance. Measures to restore and maintain operator ownership, he contends, will work for the long-range good of cities as well as of the farm population.

Other chapters in the yearbook look through the economist's spectacles on problems usually thought of primarily from the viewpoint of the natural sciences: soil conservation, forest resources, rangeland management, rural electrification.

Not all the opinions expressed in the book are in perfect agreement. Gove Hambidge, the editor, sees in this a healthy expression of democracy at work. He says:

"A certain unity of viewpoint will be evident throughout most of the book, but there are also a good many differences. The book does not represent official policy; it makes no claim to final wisdom; it simply explores agricultural problems, and the reader will sometimes find official policies treated with skepticism, controversial viewpoints defended, and things discussed that do not enter into any policy. It would have been possible to avoid such differences. But the great merit of democracy, we Americans believe, is that it not only permits but encourages the expression of different viewpoints."

Science News Letter, January 18, 1941

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Additional Reviews On Page 48

GEOPHYSICS

STRENGTH AND STRUCTURE OF THE EARTH—Reginald Aldworth Daly—*Prentice-Hall,* 434 p., charts, $3.50. Here is the earth as a whole, looked at as an engineer might look at it, with definite data for strength and mass of materials, formulae for calculating performance under given circumstances, descriptions of measuring instruments and methods, etc. Better understanding of the principles and facts set forth here should help geology, especially structural geology, to make a closer approach to being an exact science.

Science News Letter, January 18, 1941

POLITICAL SCIENCE

POLITICAL PROPAGANDA—F. C. Bartlett—*Cambridge (Macmillan),* 158 p., $1.25. See page 39.

Science News Letter, January 18, 1941

AERONAUTICS

OUR AIRLINERS—Irving Crump and Norman Maul—*Dodd, Mead,* 249 p., illus., $2. This book for older boys contains detailed descriptions of commercial airlines, the ships they fly, their operation and the training of their personnel, all fully illustrated.

Science News Letter, January 18, 1941

ENGINEERING

WORKING STRESSES—Joseph Marin—*Rutgers Univ. Press.,* 41 p., $1. Since the selection of the correct working stress values for the design of a structure is an important consideration in obtaining a safe and economical construction, this subject is a most mportant one to engineers. Data contained in this little book will help in their determinaton.

Science News Letter, January 18, 1941

CHEMISTRY

PRINCIPLES OF INORGANIC AND ANALYTICAL CHEMISTRY—Ernest J. Baldwin—*Van Nostrand,* 506 p., illus., $3.25. Divided into two parts, "Properties of Atoms and Molecules" and "Theory of Reactions," this book, it is stated, presents "in unified form the material needed for classroom study during the entire second year of chemistry."

Science News Letter, January 18, 1941

PHYSICS—CHEMISTRY

PHYSICAL CHEMISTRY, A Brief Course, With Laboratory Experiments—Louis J. Bircher—*Prentice-Hall,* 429 p., illus., $3. This text is intended for a brief college course in the subject, to give the student a background for advanced work in chemistry, or in those other sciences in which it plays an important part.

Science News Letter, January 18, 1941

HORTICULTURE

BETTER LAWNS FOR HOMES AND PARKS — Howard B. Sprague — *Whittlesey House,* 205 p., illus., $2. Lawns may be planted in autumn or spring, but it is in winter that the planning and preparation necessary for their full success must be done. This book, in a series of highly practical chapters beginning with the foundation of a lawn, the soil, and proceeding to care of the established lawn and the combating of its enemies, will enable the home owner to make the most of opportunities, and the least of handicaps, presented by his home grounds.

Science News Letter, January 18, 1941

BOTANY

THE STORY OF FOOD PLANTS—B. E. Dahlgren—*Field Museum of Natural History,* 32 p., illus., 25c. A brief but instructive pamphlet, built around the notable series of murals recently completed for the Field Museum by Julius Moessel, reproductions of which form the illustrations.

Science News Letter, January 18, 1941

ANTHROPOLOGY

WHY MEN BEHAVE LIKE APES AND VICE VERSA—Earnest Albert Hooton—*Princeton Univ. Press,* 234 p., illus., $3. See page 45.

Science News Letter, January 18, 1941

GEOPHYSICS

TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION, 1940—*National Research Council,* Pt. 1 (Stanford University regional meetings, hydrology), 144 p., $1.25; Pt. 2 (Washington annual meetings, all sections), 643 p., $3.75; Pt. 3 (Richmond symposium and Seattle regional meetings, hydrology), 280 p., $1.75; Pt. 4 (Columbus symposia: Applications of mathematics in the earth-sciences and Hydrologic problems in the Ohio and Michigan basins), 100 p., $1.

Science News Letter, January 18, 1941

ETHNOLOGY

HOPI INDIANS OF ARIZONA—Alexander MacGregor Stephen — *Southwest Museum, Los Angeles, Calif.,* 47 p., illus., 30 c. (Southwest Museum Leaflets, Number 14.)

Science News Letter, January 18, 1941

MEDICINE

L. EMMETT HOLT, Pioneer of a Children's Century—R. L. Duffus and L. Emmett Holt, Jr. — *Appleton-Century,* 295 p., illus., $3. The generation of children raised on Dr. Holt's famous baby book, *The Care and Feeding of Children,* many of whom by now have reared children of their own, will be interested in this biography of the man who served as their medical godfather. So also will the large army of physicians and others professionally devoted to the advancement of child health in which Dr. Holt pioneered.

Science News Letter, January 18, 1941

CHEMISTRY

LABORATORY OUTLINES AND NOTEBOOK FOR ORGANIC CHEMISTRY (Rev. ed.)—Cecil E. Boord, Wallace R. Brode and Roy G. Bossert—*Wiley,* 241 p., $1.75. Since this manual represents a development over a period of twenty years, with more than ten revisions in form and content, it is not surprising that the authors have produced an excellent and practical laboratory guide.

Science News Letter, January 18, 1941

CHEMISTRY

GENERAL COLLEGE CHEMISTRY (Rev. ed.)—Joseph A. Babor and Alexander Lehrman—*Crowell,* 659 p., illus., $3.75. Because of the advances in chemical science since the first edition of this book appeared in 1929, the authors have had to make nearly a complete rewriting for this, the second edition. As before, it covers extensively current views of atomic structure. The prerequisite of a high school course in chemistry is suggested for its use.

Science News Letter, January 18, 1941

CHEMISTRY

EXPERIMENTAL GENERAL CHEMISTRY—J. W. Neckers, T. W. Abbott and K. A. Van Lente—*Crowell,* 282 p., illus., $1.75. Though intended mainly to accompany Babor & Lehrman's "General College Chemistry," this laboratory manual can also be used with other texts. A table in the appendix shows the correlation with them.

Science News Letter, January 18, 1941

AGRICULTURE—ECONOMICS

FARMERS IN A CHANGING WORLD — U. S. Dept. of Agriculture—*Govt. Print. Off.,* 1215 p., illus., $1.50. See page 46.

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•First Glances at New Books

Additional Reviews On Page 47

BIOGRAPHY—EDUCATION—MEDICINE

I REMEMBER, The Autobiography of Abraham Flexner—*Simon and Schuster,* 414 p., $3.75. Both those who know well and those who have only the vaguest idea of the role Abraham Flexner has played in bringing education, both general and medical, to its present high level in the United States will find both interesting and stimulating this, his own account of his lifework and his philosophy.

Science News Letter, January 18, 1941

PHOTOGRAPHY

OUTDOOR PHOTOGRAPHY — Samuel Grierson, 99 p.; FLASH PHOTOGRAPHY—Rus Arnold, 110 p.; PHOTOGRAPHING ACTION—Victor De Palma, 110 p.; PHOTOGRAPHIC LENSES AND SHUTTERS—Richard W. St. Clair, 158 p.; SELLING YOUR PICTURES—Kurt S. Safranski, 94 p. illus., 50c. each—*Ziff-Davis.* (Little Technical Library) More of these attractive well-illustrated little handbooks. See also *SNL,* Nov. 30, 1940.

Science News Letter, January 18, 1941

BIOGRAPHY

JOHN ALFRED BRASHEAR, Scientist and Humanitarian, 1840-1920 — Harriet A. Gaul and Ruby Eiseman — *Univ. of Penna. Press,* 220 p., $2.25. Even before his death twenty years ago "Uncle John" Brashear, the mill worker who became a famous maker of optical instruments, was a legend in Pittsburgh. This interesting account of his romantic life is the third volume in the University of Pennsylvania Press' series of "Pennsylvania Lives."

Science News Letter, January 18, 1941

GEOLOGY

PETROLOGY AND GENESIS OF THE THIRD BRADFORD SAND—Paul D. Krynine—*Pennsylvania State College,* 134 p., illus., 50c.

Science News Letter, January 18, 1941

BOTANY

A KEY TO WOODY PLANTS, Based Upon the Flora of Itasca Park, Minnesota—Murray F. Buell and Robert L. Cain—*Burgess,* mimeographed, 30 p., $1.

Science News Letter, January 18, 1941

HISTORY

PORTUGUESE VOYAGES TO AMERICA IN THE FIFTEENTH CENTURY—Samuel Eliot Morison—*Harvard Univ. Press,* 151 p., illus., $2. Analyzing claims that Portuguese reached North and South America prior to Columbus' voyages, Prof. Morison concludes on the basis of existing evidence, that Columbus was the first European (after the early Northmen) to reach the New World.

Science News Letter, January 18, 1941

MATHEMATICS

PRACTICAL MATHEMATICS (Rev. ed.)—Glenn M. Hobbs, James McKinney; rev. by J. Ralph Dalzell—*Amer. Technical Soc.,* 597 p., $2.50. A useful summary of arithmetic, mensuration, logarithms, etc., either for the beginner, or one who wishes to refresh his memory. No higher mathematics is included.

Science News Letter, January 18, 1941

AGRICULTURE

MODERN AGRICULTURE (Rev. ed.) — Waldo Ernest Grimes and Edwin Lee Holton—*Ginn,* 646 p., illus., $1.72. A new edition of a successful text for beginning students in agriculture.

Science News Letter, January 18, 1941

MATHEMATICS

VAN TUYL'S MATHEMATICS OF BUSINESS—George H. Van Tuyl—*American Book Co.,* 502 p., illus., $1.52. This high school text includes such up-to-date matters as Federal Social Security.

Science News Letter, January 18, 1941

PHYSICS

EXTERIOR BALLISTICS. A Reprint of Chapter X, Exterior Ballistics, and Chapter XII, Bombing from Airplanes, from "ELEMENTS OF ORDNANCE"—Prepared under the Direction of Lt. Col. Thomas J. Hayes—*Wiley,* 98 p., $1. The essentials of exterior ballistics, for projectiles and airplane bombs, expressed in formulae which students with no more knowledge of mathematics than college first-year courses afford can readily master. Should be particularly useful in R.O.T.C. classes nowadays.

Science News Letter, January 18, 1941

ORNITHOLOGY

BIRDS OF THE GREY WIND—Edward A. Armstrong—*Oxford Univ. Press,* 228 p., illus., $3.50. Birds of the wild cliffs of northern Ireland, described by a man who loves them and the seas and shores which they frequent. Glimpses of the country, scraps of history and tradition, bits of poetry quoted here and there, blend with the story of the birds themselves to make truly enjoyable reading.

Science News Letter, January 18, 1941

MEDICINE

STRANGE MALADY, The Story of Allergy — Warren T. Vaughan — *Doubleday, Doran,* 268 p., illus., $3. Allergy has become almost a household word these days, but few people who glibly use the word understand very much about it. This book tells what it is, what can be done for it, what is yet unknown about it, and gives its entire history from the earliest records of cases to the latest medical discoveries. Dr. Vaughan has written about this very complicated subject a book as easy to read and understand as a primer, and as interesting as a novel.

Science News Letter, January 18, 1941

BIOLOGY

ORGANISERS AND GENES—C. H. Waddington—*Cambridge* (*Macmillan*), 160 p., illus., $3. The concept of genes carried the potentiality of being one of the most useful general ideas ever introduced into biology. But it was left more or less up in the air. Here were the chromosomes, carrying their loads of genes, each able to produce some profound effect in the growing body. But how were these chemical miracle-workers to make their effects felt, in the great world outside the nucleus? Means of implementation seemed lacking. Comes now another class of vital compounds, the organizers, whose presence in growing organisms seems fairly well demonstrated. How they bridge the hitherto yawning gap, and how they function, is well set forth in this compact book by a leading British biologist.

Science News Letter, January 18, 1941

GENERAL SCIENCE

A STUDY-BOOK FOR EVERYDAY PROBLEMS IN SCIENCE—Wilbur L. Beauchamp, John C. Mayfield and Joe Young West—*Scott, Foresman,* 346 p., 84c. A workbook to accompany the author's textbook "Everyday Problems In Science".

Science News Letter, January 18, 1941

PHYSICS—ASTRONOMY

TIME AND ITS RECKONING—R. Barnard Way and Noël D. Green—*Chemical Pub. Co.,* 137 p., illus., $2. What time is, according to the philosophers, what it is to the astronomers and how it is measured by man-made instruments are some of the items covered in this English publication. The presentation is clear and understandable.

Science News Letter, January 18, 1941